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Geneticist Bonnie Bassler Receives \$500,000 Gruber Genetics Prize for Pioneering Discoveries on Bacterial Communication

Bonnie Bassler

February 7, 2020, New Haven, CT – The 2020 Gruber Genetics Prize is being awarded to geneticist Bonnie Bassler, PhD, of Princeton University and the Howard Hughes Medical Institute, for her groundbreaking work on how bacteria “talk” to each other using molecular “languages.” This process is known as quorum sensing. Her discoveries have greatly expanded our understanding of the microbial world and opened up innovative approaches to promoting health and preventing disease.

The prize, which includes a \$500,000 award, will be presented to Bassler in National Harbor, MD, on April 23 at The Allied Genetics Conference.

“Dr. Bassler’s work has transformed how we view the microbial world. She has revealed the many different ways that bacteria communicate with each other, thus allowing them to behave as a collective group” says Helen Hobbs, professor at the University of Texas Southwestern and chair of the Selection Advisory Board to the Prize “Those discoveries have contributed to a paradigm shift in how we view the microbial world.”

Working first with *Vibrio harveyi*, a bioluminescent marine bacterium, and then with other bacterial species, Bassler has identified and described how these one-celled organisms send out molecular messages, or autoinducers, that enable them to count their numbers, determine when they’ve reached a critical cell density, and then simultaneously adjust their behavior to carry out group tasks, such as emitting light (in the case of *V. harveyi*) or releasing toxins (in the case of bacterial pathogens). More recently, Bassler and her team reported that bacteria-infecting viruses, known as phages, can eavesdrop on bacterial quorum-sensing conversations and then use the information they garner to their own advantage. This finding reveals that chemical signaling occurs across radically different domains.

“Dr. Bassler’s discoveries open new vistas in basic science, but are also of practical significance,” says Allan Spradling, professor at the Carnegie Institution/HHMI and member of the Selection Advisory Board. “One of the major global health challenges of today is the emergence of antibiotic resistance in human pathogens. Because of Dr. Bassler’s research, new and exciting strategies for treating bacterial disease through quorum-sensing interference are being explored. It’s a great honor to be awarding her this year’s Gruber Genetics Prize.”

Additional Information

In addition to the cash award, the recipient will receive a gold laureate pin and a citation that reads:

The Gruber Foundation proudly presents the 2020 Genetics Prize to Bonnie Bassler for her pioneering and ground-breaking discoveries illuminating the molecular language of bacterial communication through quorum sensing. She vastly expanded our understanding of the molecular, chemical and mechanistic signals that bacteria use to communicate not only within their own species, but also between species. Her work has greatly expanded our understanding of the microbial world, and opened up the possibility of modulating bacterial communication to treat human disease, and to manipulate the microbiome.

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The Genetics Prize is presented to a leading scientist, or up to three, in recognition of groundbreaking contributions to any realm of genetics research.

Laureates of the Gruber Genetics Prize:

- **2019: Bert Vogelstein**, for discoveries of genetic pathways and processes contributing to cancer
- **2018: Joanne Chory and Elliot Meyerowitz**, for helping revolutionize plant molecular biology, with implications for global agriculture, the environment, and human health and disease
- **2017: Stephen Elledge**, for discovering and characterizing the molecular mechanisms of the DNA damage response pathway in eukaryotic cells
- **2016: Michael Grunstein and David Allis**, for the discovery of the role of histone proteins and their covalent modification in the regulation of eukaryotic gene expression
- **2015: Emmanuelle Charpentier and Jennifer Doudna**, for establishing a framework for universal genome editing
- **2014: Victor Ambros, David Baulcombe, and Gary Ruvkun**, for pioneering the study of small non-coding RNA's, molecules that are recognized as playing a critical role in regulating gene expression
- **2013: Svante Pääbo**, for pioneering the analysis of ancient DNA
- **2012: Douglas C. Wallace**, for groundbreaking contributions to mitochondrial genetics
- **2011: Ronald Davis**, for pioneering development and application of recombinant-DNA techniques
- **2010: Gerald Fink**, whose work in yeast genetics advanced the field of molecular genetics
- **2009: Janet Davison Rowley**, for seminal discoveries in molecular oncology
- **2008: Allan C. Spradling**, for work on fly genomics
- **2007: Maynard V. Olson**, for contributions to genome science
- **2006: Elizabeth H. Blackburn**, for studies of telomeres and telomerase, and her science advocacy
- **2005: Robert H. Waterston**, for a pivotal role in the Human Genome Project
- **2004: Mary-Claire King**, for three major findings in modern genetics: the similarity of the human and chimpanzee genomes, finding a gene that predisposes to breast cancer, and forensic genetics.
- **2003: David Botstein**, for establishing the ground rules for human genetic mapping
- **2002: H. Robert Horvitz**, who defined genetic pathways responsible for programmed cell death
- **2001: Rudolf Jaenisch**, who created the first transgenic mouse to study human disease

The Prize recipients are chosen by the Genetics Selection Advisory Board. Its members are:

Kathryn Anderson, Sloan Kettering Institute; **Utpal Banerjee**, University of California Los Angeles; **Marlene Belfort**, University at Albany, SUNY; **Aravinda Chakravarti**, New York University,

School of Medicine; **Helen Hobbs**, University of Texas Southwestern (Chair); **James Lupski**, Baylor College of Medicine; **Allan Spradling**, Carnegie Institution for Science.

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The Gruber International Prize Program honors individuals in the fields of Cosmology, Genetics and Neuroscience, whose groundbreaking work provides new models that inspire and enable fundamental shifts in knowledge and culture. The Selection Advisory Boards choose individuals whose contributions in their respective fields advance our knowledge and potentially have a profound impact on our lives.

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For more information on the Gruber Prizes, visit www.gruber.yale.edu, e-mail info@gruber.yale.edu or contact A. Sarah Hreha at +1 (203) 432-6231. By mail: The Gruber Foundation, Yale University, Office of Development, PO Box 2038, New Haven, CT 06521.

Media materials and additional background information on the Gruber Prizes are in our online newsroom: www.gruber.yale.edu/news-media

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